



Medicine for Managers

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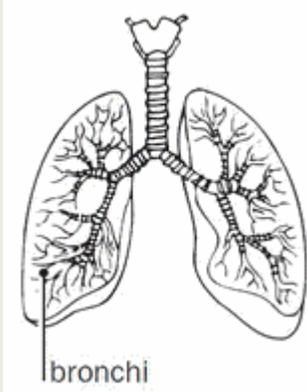
A New Look At Asthma

Probably everyone knows that asthma is an increasingly common condition, of which the cardinal signs are wheezing, breathlessness, cough and chest tightness. Symptoms vary from the very mild to the very severe. For most people with asthma in the UK the symptoms are well controlled, although for some people finding the right treatment or combination of treatments may be challenging.

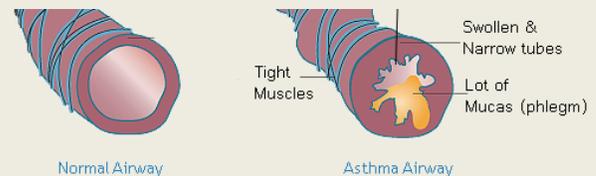
Sometimes even well controlled asthma may suddenly become worse and these 'attacks', or exacerbations may be difficult to control. On occasion severe asthma requires admission to hospital and it still causes deaths every year, though with modern treatments, the number has declined significantly.

What is 'asthma'?

Asthma, sometimes called **bronchial asthma**,



is a disorder of the lungs and results from inflammation of the bronchi, the tubes through which air passes, and spasm of the smooth muscle which encircles the bronchi. The result is that the lumen (cavity) of the bronchus is narrowed by the accumulation of inflammatory mucus and the tubes are further narrowed by the muscle spasm which constricts them.



The illustration gives an indication of what happens. The normal airway lining becomes inflamed and thick mucus containing inflammatory cells accumulates in the cavity of the bronchus.

Together with the spasm of the smooth muscle in the wall, the bronchus is significantly, sometimes seriously, narrowed restricting air entry and reduces oxygen exchange with the tissues. The sufferer therefore becomes breathless, the chest feels tight and coughing occurs to try to eliminate the thick mucus (phlegm).

Why does it happen?

The changes of asthma are triggered by allergens which are inhaled resulting in the inflammatory changes and the spasm of the bronchial muscle.

The bronchi become more sensitive and exposure to the affecting agent will cause bronchial constriction (narrowing) with the

resulting wheeze and breathlessness. A whole range of agents can trigger asthma



including pollens, animal fur,



house dust cigarette medicines, infections in



mite, smoke, some mould and the lung.

Environmental factors such as air pollution, particularly from car exhausts, also precipitate episodes.



Asthma may also be occupational and people may develop symptoms from exposure to industrial fumes such as chemicals in paints, from wood dust and from proximity to various animals. Therefore paint sprayers, metalworkers, chemical workers, animal handlers and those working in the timber industry may be at risk. Strong emotions and exercise may also induce the symptoms.

Symptoms of Asthma

The classic symptoms are wheezing, cough, with or without the production of thick white sputum (phlegm) and breathlessness. Someone with an attack of asthma may also show intercostal retraction (where the spaces between the ribs appear indrawn) and the muscles in the neck appear more prominent. In the most severe of cases, the lips and face may appear bluish, the pulse is rapid, there is sweating and the patient is anxious because of the distress together with drowsiness and confusion. There is chest tightness and there may be chest pain as well.

Diagnosis of Asthma

In most cases the diagnosis is apparent on visual inspection. There is typically a history of cough or wheezing and usually inhaler use and the

patient may have associated conditions such as eczema or hay fever. There are a number of tests to confirm the diagnosis and to assess the degree of severity of the episode.

Peak Flow Meter: This is a simple, hand-held device and it measures the maximum ability to blow air from the lungs.



The patient takes as deep a breath as possible and blows the air through the

machine as fast as they are able. The peak flow of air from the lungs is measured. A decreasing peak flow will indicate a worsening episode of asthma.

Patients are very commonly issued with a peak flow meter both to regularly measure and record peak flow to identify patterns of variable air flow to adjust treatment and also as an early warning of a worsening episode of asthma.

Spirometry: This test of breathing measures the efficacy with which the lungs are working. It involves taking a deep breath and then fully emptying the lungs as fast as possible. It measures the FEV1 (the Forced Expiratory Volume in 1 second) and the FVC (the Forced Vital Capacity, which is the total amount of air that can be breathed out). Sometimes it is difficult to do the test and it may take several attempts to get it right. The patient can then be given medication and the test can be repeated to assess the efficacy of the drug(s).

Allergy Testing: This may form an important part of identifying the trigger for the asthma and tests exist for many potential specific allergens. Testing may also be very important in the diagnosis of occupational asthma.

Specialised Tests: In respiratory laboratories in hospitals there may be a need for more specialised testing in those patients whose asthma is persistent or refractory to treatment. Such tests include challenge with different allergens to see the degree to which they cause the symptoms and measurements of inflammatory change in the lung.

The History of the Asthma and its Treatment

In the 1960s the treatment of asthma was revolutionised by the introduction by *Allen and Hanbury* of the iconic *Ventolin* (salbutamol) inhaler. As a disease it was first recognised at least 4,500 years earlier by the ancient Egyptians and, in about 450 BC, Hippocrates recognised it as a specific condition, giving the name which has developed into 'asthma' and which means 'panting' in Greek. It was recognised to be associated in some cases with the emotions in about 150 BC. The first descriptive paper in 1873 described the disease and recommended chloroform liniment rubbed on to the chest. In 1886 the association with hay fever was identified and in 1905 adrenaline was referenced in treatment. Steroid drugs were introduced in the 1950s and *Ventolin* and its array of successors changed the pattern of asthma treatment from the sixties until the present day.

Essentially the treatment of asthma consists of two forms of treatment; that designed to relieve the symptoms by opening the narrowed airways, and that designed to prevent the symptoms of asthma by maintaining the airways open.

The former, also known as '**relievers**', are drugs known as short-acting **beta-agonists** and they work by relaxing the smooth muscle in the walls of the bronchi to open the airways to enable the increased passage of air and to enable the mucus to be more effectively cleared. They do

not treat the inflammation in the airways and so they relieve symptoms rather than reduce the physical changes associated with the condition. Common drugs in this category are *salbutamol* and *terbutaline*. They are safe and with minimal side effects in normal dosage. These inhalers are usually blue in colour.

The latter group, also known as '**preventers**', reduce the amount of inflammation in the airways and diminish their sensitivity to allergens. They are not used in response to symptoms but regularly to maintain the stability of the airways.

If used regularly, they may prevent any symptoms such that the reliever inhaler may not be required, or may need to be used only occasionally. The drug in the preventer inhaler is a steroid and the commonly used steroids are *beclometasone* and *budesonide*. Although steroids reduce the inflammatory response they may also impair local immunity and fungal infections in the mouth and throat may be a side-effect. Preventer inhalers are usually brown or, sometimes, red.

Over the last fifty years there have been many developments to improve the treatment. Key amongst them has been the creation of longer acting reliever drugs. The effects of such drugs last twice as long at least as the standard reliever drugs.

Examples in common use include *salmeterol* and *formoterol*. With twice daily usage such drugs may give 24-hour therapeutic effect. By combining these drugs with preventer agents, the benefits of effective control of symptoms may be joined with the anti-inflammatory effects of the preventers to produce more effective control. Commonly used combination inhalers of this type are *Seretide*, *Symbicort* and

Fostair amongst others. Such inhalers are commonly purple or maroon.

Other newer drugs include the **leucotriene receptor antagonists**. These drugs block particular receptors preventing the cascade of changes which result in an asthma attack. They are effective in some patients who are resistant to the effects of the inhalers but they do have side effects including liver toxicity. Probably the best known drug in the group is *montelukast*.

Omalizumab (Xolair) is the first of a new type of medication which binds to a protein involved in the immune response and lowers the level in the blood resulting in a reduction in risk that a hypersensitivity reaction will occur and therefore reducing the risk of an attack. It is administered by injection every 2-4 weeks. If ineffective it should be abandoned after 12 weeks.

The use of the range of inhalers has replaced the other drugs which were used a generation ago. Older readers who suffered acute asthma attacks will remember *aminophylline* administered by injection and *ventolin* tablets that caused severe tremors. The *sodium cromoglicate (Intal)* inhaler was introduced because of its anti-inflammatory effect but was found to be relatively weak. Theophylline has been available for many years and is still used for some patients for whom the newer remedies are not fully effective, but they do have more side effects than the newer treatments. For some, oral steroids are necessary to suppress the inflammatory reaction but they are used for as short a time as possible in the lowest effective dose because of the range of side effects including weight gain, moon face, reduced immune response and the more generalised reduced inflammatory response.

For asthma sufferers it is also important to reduce asthma symptoms by avoiding the triggers and any substances that irritate the airways, such as

- Covering bedding with allergy-proof coverings
- Keeping the house dust free and avoiding food in bedrooms
- Keeping animals out of the house and particularly the bedroom
- Eliminating tobacco smoke from the house
- Remove carpets from bedrooms and vacuum regularly
- Use unscented detergents and cleaning materials
- Avoid air pollution, dust and fumes where possible.

For those with chronic asthma, a knowledge of the triggers is important to avoid attacks. The regular use of the peak flow meter may be invaluable in identifying those agents which can reduce airflow and thereby maintain better health.

Asthma inhalers now come in a range of shapes and sizes; metered aerosols, dry powder devices, in a spray or a capsule form and during that period since *salbutamol (Ventolin)* heralded the change



in effective asthma treatment a revolution in treatment has occurred.

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